

## A METHOD OF MANUFACTURING A MOULDED ARTICLE AND A PRODUCT OF THE METHOD.

This invention relates to a method of manufacturing a moulded article and a product of the method. It is particularly though not exclusively concerned with moulding of footwear including swimming fins.

In the manufacture of moulded articles of plastics materials it is known to line the mould with a coating of gel material prior to the injection of the bulk of the plastics material. In this way it is possible to achieve a smooth external surface on the moulded product. The surface of the resulting product if subject to abrasion tends to scuff with a consequent deterioration in appearance. In particular footwear can be readily scuffed on a variety of surfaces and any surface decoration is liable to damage particularly if worn in a waterside or seaside environment.

According to a first aspect of the present invention there is provided a method of manufacturing a moulded product comprising the steps of:

- providing a mould conforming to the shape of the product the mould serving to define one or more moulding surfaces which are to be reproduced in an article formed by means of the mould;

- mounting in the mould an article including or forming an image comprising at least one device, logo, letter, word or words or combinations of these in such a way that most, if not all of the article lies within the mould out of contact with the or each moulding surface; and

- injecting into the mould a supply of polymerisable material so as to immerse the article; the material, at least following polymerisation being flexible and so providing at least in part, a substantially transparent product; and

- withdrawing the product from the mould.

According to a first preferred version of the first aspect of the present invention the step of providing product is an article of footwear such as a shoe or swimming fin (also known as a flipper).

According to a second preferred version of the first aspect of the present invention Or of the first preferred version thereof the step of providing the mould conforming to the shape of the product serves also to juxtapose a previously formed or moulded product for attachment to a product formed in the injection step.

According to a second aspect of the present invention there is provided a moulded product which is of flexible plastics material moulded by the method of the first aspect or any preferred version thereof.

An exemplary embodiment of the invention will now be described with reference to the accompanying drawings of steps of a method of moulding a swimming fin of which:

- Figure 1 shows a side view of a mould in an open configuration;
- Figure 2 shows the mould of Figure 1 with the addition of an article;
- Figure 3 shows the mould of Figure 2 in a closed configuration; and
- Figure 4 shows the mould of Figure 3 opened following a mould injection step.

#### Figure 1

An open mould 11 has internal moulding surface 12, 13 conforming to the surfaces of a swimming fin to be manufactured by means of the mould. The mould 11 includes locating jaws A1, A2 and B1, B2 whose function is described hereafter.

#### Figure 2

Prior to the moulding of product the moulding surfaces 12, 13 are cleaned and coated with a release agent. An article 14 is mounted by means of lower jaws A1, B1 so as to lie within the mould 11 but clear of the moulding surfaces 12, 13. The article 14 comprises a clear acrylic strip 14A on which an image or series of images is placed whether by

printing or otherwise and whether flat, embossed or recessed on the strip 14A. In this case the image is made up of a sequence of the letter 'FF' but any type of image can be utilised including a device, logo, letter, word or words or combinations of these or patterns or bands or whatever. In this case the strip 14A is a clear strip of uniform width. In alternative versions it can be made single or multi coloured. The article 14 rather than being a flat strip can be curved

More than one article corresponding to article 14 can be used so that in a finished moulded article a variety of images are visible within the moulded article lying at different depths from an outside surface of the article.

#### Figure 3

This shows the mould of Figure 2 now closed resulting in the article 14 being clamped at one end between upper jaw A2 and lower jaw A1 and at the other end to the one end between upper jaw B2 and lower jaw B1. Prepared liquid plastic material including accelerator and catalyst are then injected by way of sprue 31 into the mould from a filling machine. Once injected material is seen venting from outlet 32 the injection process is stopped and polymerisation allowed to occur.

#### Figure 4

Once polymerisation of the moulded article is completed the mould 11 is opened to reveal the completed product P which being of transparent plastic reveals the images on article 14. The strip 14A being mainly transparent and embedded in the clear plastics material of the article 14 is now not visible and only the image is seen.

The product P is removed from the mould 11 which is then prepared for a further injection step.

The above exemplary embodiment describes the production of an independent article. However the further invention further embraces the use of the described process by

juxtaposing a modified version of mould 11 to enable it to locate a previously formed component, such as a shoe or sandal so that the step of forming the product P the product P is attached to the juxtaposed shoe or sandal.

In addition the article 14 is shown clamped in place by jaws A1, A2 and B1, B2. In this case this serves to resist any displacement of the article 14 arising during the injection stage. Where support at either end of a strip is not sufficient of itself then the article bearing the image which is to be embedded in the product then in addition to the jaws or as a replacement for them other locating means can be used to provide for the correct alignment of the images to be displayed through the body of the product. If necessary the locating means can themselves be of transparent material so as to be rendered invisible in the finished product.

While the exemplary embodiment refers to an article 14 of limited width it is envisaged that the article could be comparable in extent to the overall size of the moulded article in which it is embedded following moulding so that any image carried on the article is visible over the major part of the product and from any direction. Thus the article can be any size from the relatively small proportion of the whole product as shown in the drawings up to a filling the product.